

HR-365 Evaluation of Bridge Replacement Alternatives for County Bridges

Key Words: Bridges, County, Construction, Prestressed, Precast, Concrete

ABSTRACT

Recent reports have indicated that 23.5 percent of the nation's highway bridges are structurally deficient and 17.7 percent are functionally obsolete. A significant number of these bridges are on the Iowa county road system. The objective of the investigation described in this report was to identify, review and evaluate replacement bridges currently being used by various counties in Iowa and surrounding states. Iowa county engineers, county engineers in neighboring states as well as private manufacturers of bridge components, and regional precast/prestressed concrete manufacturers were contacted to determine the most common replacement bridge types being used. Depending upon the findings of the review, possible improvements and/or new replacement bridge systems were to be proposed.

A questionnaire was developed and sent to county engineers in Iowa and several counties in surrounding states. The results of the questionnaire showed that the most common replacement bridges in Iowa are the continuous concrete slab and prestressed concrete bridges. The primary reason these types are used is because of the availability of standard designs and because of their ease of maintenance. Counties seldom construct these types of bridges using their own labor forces, but instead contract the work. However, county forces are used to construct steel stringer, precast reinforced concrete and timber bridges. In general, 69 percent of the counties indicate an ability and willingness to use their own forces to design and construct relatively short span bridges (i.e., 40 ft or less) provided the construction procedures are relatively simple.

Several unique replacement bridge types used in Iowa that are constructed by county forces are documented and presented in this report. Sufficient details are provided to allow county engineers to determine if some of these bridges could be used to resolve some of their own replacement bridge problems. Where possible, cost information has also been provided. Each of these bridge types were evaluated for various criteria (e.g., cost effectiveness, conformance AASHTO standards, range of sizes, etc.) by a panel of four Iowa county engineers; a summary of critique is included.

After evaluating the questionnaire responses from the counties and evaluating the various bridge replacement concepts currently in use, one new bridge replacement concept and one modification of a current Iowa county bridge replacement concept were developed. Both of these concepts would utilize county labor forces.